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Dear Dick,

With the release of the Phase 2 document and the addition of the Stage One action list to the Calfed-revised Strategic Plan, I would like to offer some ideas on how Calfed might move effectively to the next steps of effectively selecting, designing, and implementing specific Stage One restoration actions. I realize that the next steps need to be discussed widely among staff, stakeholders, and scientists. These remarks are based largely on comments Wim Kimmerer and I prepared on the list of Stage One actions (on behalf of the Core Team) at the request of the Integration Panel.

Conceptual Models

The conceptual models underlying proposed Phase One actions need to be clarified. I doubt this task can be effectively accomplished entirely by internal Calfed staff nor by being farmed out to a consultant. Rather, it should draw more broadly upon expertise of independent scientists working with a larger group of scientists and stakeholder scientists. Calfed should assemble an expert panel and convene a workshop that would draw upon existing expertise in the region, essentially the "Tier 2" experts envisioned for the Strategic Plan effort. The expert panel could be based on the Core Team model but should also include members from other regions (in addition to Dr. Healey). At some point it would be desirable to get review and input from the affected stakeholder community.

The Need for a Comprehensive, System-Wide Prioritization

Calfed should take a comprehensive view of the restoration program as a basis for setting priorities for actions by articulating conceptual models of how the ecosystem formerly operated, how it works (or fails to work) now, and identifying critical points impairing ecosystem health.

As an illustration of how this comprehensive view might be undertaken, the historical and current extent of spring-run salmon habitats might be mapped, with key barriers to migration to spawning areas identified. The extent of habitats lost due to each barrier could be quantified and the potential for removal or modification for each barrier considered. In many or most cases, economic or political considerations will render barrier removal unrealistic. However, it is important that such potential actions be identified by a scientific process first, and eliminated (if appropriate) by considering economic/political realities in a clearly articulated second step, in which the potential ecosystem benefits can be explicitly weighed against the costs and constraints. If we allow economic and political considerations to exclude many potential actions at the outset, we may fail to recognize and evaluate important opportunities. Similarly, the habitat benefits of removing barriers need to be realistically addressed. Some barriers may be relatively easy to remove (economically and politically) but would not restore large reaches of spawning and rearing habitat because of the presence of natural barriers or due to other factors.

Actions to restore ecosystem processes need to be identified based on such a comprehensive, scientific look at the system. Only through such an approach can we feel confident that the full range of potential actions has been considered and weighed, and that the relative advantages of one action have been weighed against the relative advantages of another action.

Actions Not Included

The decision to select a particular project must be put in a larger context. By funding a particular project, we are choosing not to fund something else. The choices and tradeoffs involved in this decision need to be presented, and this can only be done in the context of the entire ecosystem.

For example, it has been proposed that the Yolo Bypass floodplain be subject to frequent inundation to create habitat for fish and other organisms by turning more water into the bypass (at Fremont Weir) and using inflatable barriers in the toe drain to induce overbank flooding. Using flood bypasses for habitat was identified in the Strategic Plan as a key opportunity. Experimenting with inflatable barriers could be a very suitable adaptive management action: there is a testable hypothesis (whose implications could extend to other bypasses), the results lend themselves well to measurement (unlike most floodplains, fish production from the bypass can be measured at the downstream outlet), the action would be relatively inexpensive to implement, and the action would be reversible if the results were disappointing (just remove or don't inflate the barriers). However, the Yolo Bypass idea did not appear in the list of Stage One actions. The Integration Panel may have already analyzed

this and other actions and rejected them under Phase One for good reasons, but these decisions and their basis need to be presented if the results of the process are to be accepted by the scientific community.

Tangible Projects or "More Studies"

There is still an emphasis on projects that can be physically constructed, instead of scientific and planning studies. Given that we still need to learn a lot about the system to effectively restore viable populations of salmon (and other species), experimental manipulations designed to yield needed information and targeted research would seem appropriate in Stage One. I understand the political and public relations advantage of having tangible, visible projects that involve building something. However, by gaining better insights into how the ecosystem functions, we may be able to direct the bulldozers in a much more effective direction in a few years' time.

For example, it was only through a historical geomorphic study that we now understand the effect of a 1949 flood control project on Lower Deer Creek. Confinement of flood waters by levees and periodic bulldozing of the channel and stripping away vegetation (for maintenance of channel capacity) resulted in a decline in habitat conditions. Planting riparian vegetation along the channel margins and addition of spawning-sized gravel have been proposed for Deer Creek, but the seedlings and gravel will probably wash out in the next flood because of the high shear stresses in the artificially straightened and confined channel. These proposed actions would only address symptoms of the underlying problem: unnatural concentration of flows in a narrow channel as a conventional strategy to control floods. A more sustainable approach to improving habitat in Deer Creek (now being explored by the Deer Creek Watershed conservancy) would be to manage floods in a different way, by permitting some flood waters to pass over the floodplain, thereby relieving the pressure within the channel and eliminating the need to "maintain" channel capacity. Without the insights into the geomorphic and ecological processes from the study, we would still be talking about planting willows and adding gravel to the stream, addressing only symptoms of the real problem. How many of the restoration projects we now envision are likewise dealing with symptoms only?

Moreover, some of the potentially most serious threats cannot be addressed with bulldozers or even with more water. For example, "new towns" in the Delta (or along its margins) have been proposed and already approved by local jurisdictions. Will not such new urbanization affect ecosystem processes in the Delta? While it is outside Calfed's scope to affect local land-use decisions, at the least Calfed should understand these trends before committing to expensive projects that may be rendered

useless by future land use changes. More proactively, Calfed could use Phase One funds to develop (in partnership with federal, state, and local agencies) planning strategies to minimize negative ecological effects of future urban growth.

Commitments Now vs Flexibility to Learn Over Time

Must we make decisions and commitments for the entire seven-year Stage One period? Given our imperfect understanding of the system, it may be preferable to fund some actions only for the first three years, designed to maximize learning about the system. After learning from our actions in the first three years, we can then decide if and how to proceed with larger implementation of the action.

Clear Goals and Learning From Projects

Many actions as described in the current Stage One action list have very broadly defined goals. Without defining more specific objectives, it will be difficult or impossible to measure project performance and thus gain the necessary information about system response needed for adaptive management. For each project, the information to be gained should be explicitly stated, so that all Calfed ecosystem projects can be carried out in a real adaptive management framework. All proposed projects should be subjected to the 'vetting' process outlined in the Healey diagram (Strategic Plan for the Ecosystem Restoration Program, September 30, 1998, Figure 2-4).

Coordination with Other Calfed Programs

I note in the Phase 2 document that Cottonwood Creek is listed as a potential reservoir site. A reservoir will trap gravel, thereby reducing gravel transport to the Sacramento River. This seems to conflict with the Stage One action to move gravel mining operations from the bed of Cottonwood Creek to increase the transport of gravel to the Sacramento River. I realize that with such a large, complex program as Calfed, it will be difficult to coordinate every aspect, and that there will remain some fundamental conflicts among objectives of different programs (e.g. some aspects of levee stability vs. habitat enhancement in the Delta). Nonetheless, it would seem a worthwhile effort to identify these potential conflicts early on so they can be resolved through an open process, with good scientific information about the consequences of different choices, rather than allowing one action to cancel another by default.

Products

The comprehensive view of the system by independent scientists, Tier 2 scientists, and stakeholder scientists envisioned here should produce these products:

1. Conceptual models at the landscape and regional scale, from which ecosystem processes can be better understood, and critical links for priority species can be identified.

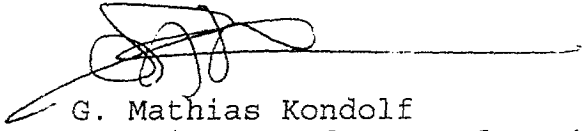
2. Priority areas for targeted research and demonstration projects.

3. Stage One actions that explicitly flow from this framework, and which will yield insights that can improve our conceptual models in the future.

4. Monitoring plans for restoration projects, including attempts to retrofit already-approved projects with monitoring plans. This effort should obviously dovetail with and build upon CMARP, but the ERP cannot ignore monitoring and leave it all to CMARP because the monitoring is such an integral part of an adaptive management approach to ecosystem restoration.

Comments on individual Stage One actions were attached to an email to Wendy Halverson on 19 January, and I would be happy to forward a copy to you if you have not seen them yet. Thank you for your openness to my ideas and those of my scientific colleagues throughout the Strategic Plan and the follow up review process.

Sincerely yours,



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